

OUTLINE
of
INTRODUCTION TO MOUNTAINEERING SAFETY

Compiled
by
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for
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"No snow flake in an avalanche ever feels responsible"

--Avalanche Review

AN INTRODUCTION TO MOUNTAINEERING SAFETY

I. MOUNTAINEERING ACTIVITIES

II. HAZARDS IN MOUNTAINEERING

*OBJECTIVE HAZARDS

Natural Processes

Manufactured dangers

*SUBJECTIVE HAZARDS

III. SEARCH AND RESCUE

IV. MOUNTAINEERING FIRST AID

*Emergency Care

*Mountain Miseries

v. A CLIMBING CODE

VI. SAFETY ON TREK

*"When a climber is injured, he apologizes to his friends.
When a climber is killed, his friends apologize for him."*

--Alps proverb

I. MOUNTAINEERING ACTIVITIES

"A mountaineer is one who seeks the freedom of the hills, full of wilderness citizenship, with all of its privileges and rewards, its responsibilities and demands."

--Mountaineering: Freedom of the Hills

*VARIETIES OF MOUNTAINEERING

- Day hikes
- Backpacking
- Walk-up climbs
- Rock climbs
- Snow/Ice climbs
- Glacier travel

*RATING OF CLIMBS

1. - hiking
2. - off-trail scrambling
3. - climbing; rope for beginners
4. - belayed climbing
5. - leader places protection
6. - aid climbing

"Time spent in the mountains will not be deducted from your life."

-- Carl Smith

II. HAZARDS IN MOUNTAINEERING

*OBJECTIVE HAZARDS

-NATURAL PROCESSES

Weather: cold rain
snow
wind
lightning
whiteout
nightfall

Altitude: acute mountain sickness
High altitude pulmonary edema
High altitude cerebral edema
dehydration
solar radiation

Gravity: rockfall
river-crossing
falling, slipping on rock and snow
avalanches

-MANUFACTURED DANGERS

Equipment: rope
knots
hardware
stoves

People: lack of attention
unpreparedness

*SUBJECTIVE HAZARDS

Overconfidence: choice of route
companions
preconditioning
inadequate preparation

Fear

Lack of Knowledge

Poor judgement

"I like to think that if you're not scared, you're not having fun---"

---Jim Bridwell

III. SEARCH AND RESCUE

*LOCATE THE VICTIM

*REACH THE VICTIM

*STABILIZE THE VICTIM

- Approach the victim safely
- Perform urgently needed first aid or emergency rescue
- Treat for shock
- Check for other injuries
- Make the victim comfortable, if possible

*EVACUATE THE VICTIM

- Evacuation by the party
- Getting outside help
- Transport of the victim

*ACCIDENT STATISTICS

*"Where does the power come from to see the race to the end?
It comes from within."*

--Chariots of Fire

IV. MOUNTAINEERING FIRST AID

*SEQUENCE OF FIRST AID TREATMENT

- Evaluate situation
- Check/restore breathing
- Check/restore circulation
- Check/restore bleeding
- Treat for shock
- Perform detailed physical examination

*EMERGENCY CARE

- Pulmonary resuscitation
- Cardiopulmonary resuscitation (CPR)
- Control of hemorrhage
- Shock
- Fractures
- Injuries to the head and spine
- Injuries to joints and muscles
- Hypothermia
- High Altitude Pulmonary Edema

*MOUNTAIN MISERIES

- Blisters
- Acute Mountain Sickness
- Muscular cramps
- Sunburn

"Life is either a daring adventure, or nothing."

-Helen Keller

V. A CLIMBING CODE

- *A climbing party of three is minimum, unless adequate prearranged support is available. On glaciers, a minimum of two roped teams is recommended.
- *Rope up on all exposed places and for all glacier travel. Anchor all belays.
- *Keep the party together, and obey the leader or majority rule.
- *Never climb beyond your ability and knowledge.
- *Never let judgement be overruled by desire when choosing the route or turning back.
- *Carry at all times the clothing, food, and equipment necessary.
- *Leave the trip schedule with a responsible person.
- *Follow the precepts of sound mountaineering as set for in textbooks of recognized merit.
- *Behave at all times in a manner that will not reflect unfavorably upon mountaineering.

THE SAFE ATTITUDE: A BASIS FOR CONTROL

The development of a safe mountaineering attitude proceed along three lines:

- 1) Each person must be instilled from the very beginning with a respectful attitude toward mountains, a realization of the basic relationship between their hazards and his limitations.
- 2) Each person must develop the climbing skill and knowledge of specialized techniques and equipment which supplement his natural abilities.
- 3) Each must encounter - preferably vicariously - the actual situations which teach him the distinction between safety and danger and enable him to evaluate his margin of safety at all times

-- Mountaineering: The freedom of the Hills

"Hold tight to your dreams, they give you something to life for."

--from a Chinese fortune cookie



Choose materials that are proof against wind-driven rain and cover good, heavy, wool, and light. Polyurethane coated nylon is best. The coatings won't last forever. Inspect carefully and test under a cold shower before you leave home. Ponchos are poor protection in wind.

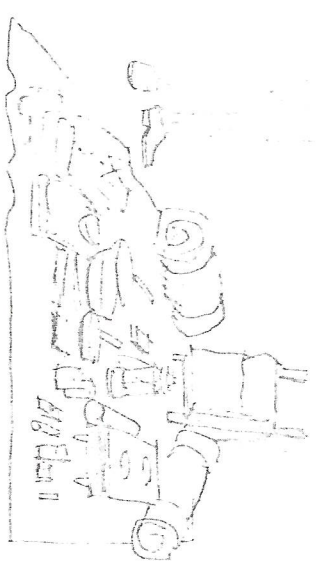
Take woolen clothing for hypothermia wearers; Ziploc woolen underwear... or... long wool pants and sweater or shirt. Include a hat cap that can protect neck and chin. Cotton underwear is worse than useless when wet.

A stormproof tent gives best shelter. Take plastic sheeting and nylon twine for rigging additional four-weather shelter.

Carry trail food... nuts, jerky, and candy... and keep nibbling during hypothermia wearers.

Take a gas stove or a plumber's candle, flammable paste, or other reliable firestarter.

DON'T WAIT FOR AN EMERGENCY. USE THESE TIPS TO AVOID OR MINIMIZE EXPOSURE.



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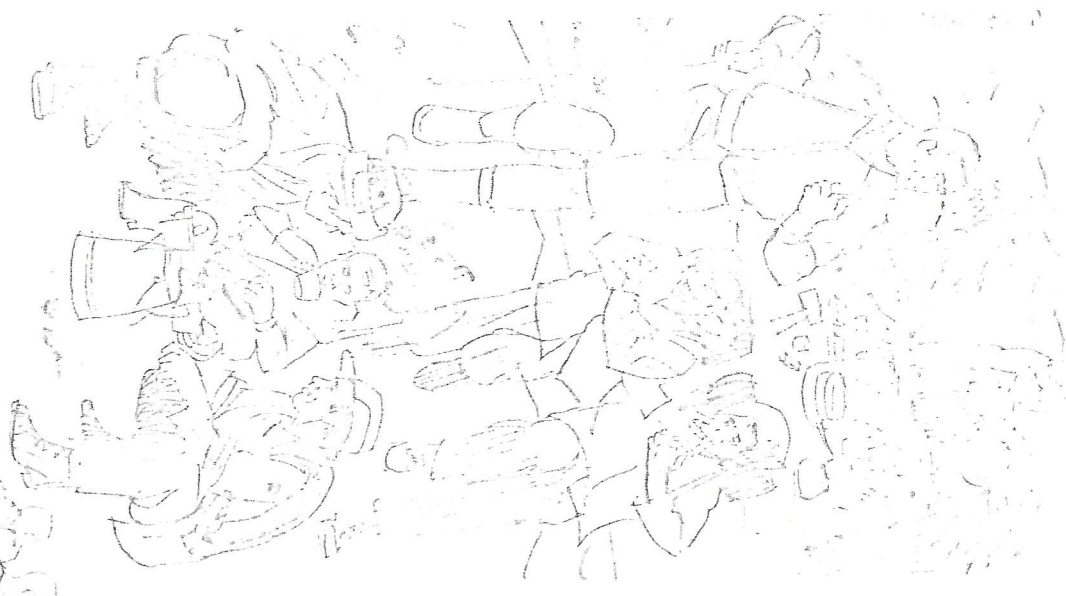
THINK HYPOTHERMIA

If you are outdoors for recreation, you presumably do not intend to jeopardize your life.

Hypothermia may be a new word to you, but it's the *only* word that describes the rapid, progressive mental and physical collapse accompanying the chilling of the inner core of the human body.

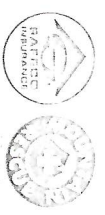
Hypothermia is caused by exposure to cold, aggravated by wet, wind, and exhaustion. It is the #1 killer of outdoor recreationists.

- TAKE NEED OF "HYPOTHERMIA WEATHER"
- WATCH CAREFULLY FOR WARNING SYMPTOMS.
- CHOOSE EQUIPMENT WITH HYPOTHERMIA IN MIND.
- THINK HYPOTHERMIA.



THE WAYS OF DEFEAT AGAINST HYPOTHERMIA

From the motion picture ... BY NATURE'S RULES



COLD KILLS IN TWO DISTINCT STEPS

STEP ONE: EXPOSURE AND EXHAUSTION

The moment your body begins to *lose heat* faster than it produces it, you are under-going exposure. Two things happen:

1. You voluntarily *exercise to stay warm*.
 2. Your body makes involuntary adjustments to preserve *normal/temperature in the vital organs*.
- Either response drains your energy reserves. The only way to stop the drain is to reduce the degree of exposure....

● THE TIME TO PREVENT HYPOTHERMIA IS DURING THE PERIOD OF EXPOSURE AND GRADUAL EXHAUSTION.

STEP TWO: HYPOTHERMIA

If exposure continues until your energy reserves are exhausted:

1. Cold reaches the brain depriving you of judgment and reasoning power. *You will not realize this is happening.*
2. You will lose control of your hands.

This is hypothermia. Your internal temperature is sliding downward. Without treatment, this slide leads to stupor, collapse, and death.

YOUR FIRST LINE OF DEFENSE: AVOID EXPOSURE

1. **STAY DRY.** When clothes get wet, they lose about 90% of their insulating value. Wool loses less; cotton, down, and synthetics lose more.
2. **BEWARE THE WIND.** A slight breeze carries heat away from bare skin much faster than still air. Wind drives cold air under and through clothing. *Wind refrigerates wet clothes* by evaporating moisture from the surface. **WIND MULTIPLIES THE PROBLEMS OF STAYING DRY.**
3. **UNDERSTAND COLD.** Most hypothermia cases develop in air temperatures between 30 and 50 degrees. Most outdoorsmen simply can't believe such temperatures can be dangerous. They fatally underestimate the danger of being wet at such temperatures.
 - 50 degree *water* is unbearably cold. The cold that kills is *cold water* running down neck and legs, *cold water* held against the body by sopping clothes, *cold water*-flushing body heat from the surface of the clothes.



● DON'T ASK, "HOW COLD IS THE AIR?" ASK INSTEAD, "HOW COLD IS THE WATER AGAINST MY BODY?"

4. **USE YOUR CLOTHES.** Put on raingear *before* you get wet. Put on wool clothes *before* you start shivering.

YOUR SECOND LINE OF DEFENSE: TERMINATE EXPOSURE

If you cannot stay dry and warm under existing weather conditions, using the clothes you have with you, *terminate exposure*.

1. **BE BRAVE ENOUGH TO GIVE UP REACHING THE PEAK OR GETTING THE FISH OR WHAT-EVER YOU HAD IN MIND.**
2. Get out of the *wind and rain*. Build a fire. Concentrate on making your camp or bivouac as secure and comfortable as possible.

NEVER IGNORE SHIVERING

Persistent or violent shivering is clear warning that you are on the verge of hypothermia. **MAKE CAMP.**

FORESTALL EXHAUSTION

Make camp while you still have a reserve of energy. Allow for the fact that exposure greatly reduces your normal endurance.

You may think you are doing fine when the fact that you are exercising is the only thing preventing your going into hypothermia. If exhaustion forces you to stop, however briefly:

1. Your rate of body heat production instantly drops by 50% or more.
2. Violent, incapacitating shivering may begin immediately.
3. You may slip into hypothermia in a matter of minutes.

APPOINT A FOUL-WEATHER LEADER

Make the best-protected member of your party responsible for calling a halt before the least-protected member becomes exhausted or goes into violent shivering.

YOUR THIRD LINE OF DEFENSE: DETECT HYPOTHERMIA

If your party is exposed to wind, cold, and wet, **THINK HYPOTHERMIA.** Watch yourself and others for symptoms.

1. Uncontrollable fits of shivering.
2. Vague, slow, slurred speech.
3. Memory lapses. Incoherence.
4. Immobile, fumbling hands.
5. Frequent stumbling. Lurching gait.
6. Drowsiness (to sleep is to die.)
7. Apparent exhaustion. Inability to get up after a rest.

YOUR FOURTH AND LAST LINE OF DEFENSE: TREATMENT

The victim may deny he's in trouble. Believe the symptoms, not the patient. Even mild symptoms demand immediate, drastic treatment.

1. Get the victim out of the wind and rain.
2. Strip off *all* wet clothes.
3. If the patient is only mildly impaired:
 - a. Give him warm drinks.
 - b. Get him into dry clothes and a warm sleeping bag. Well-wrapped, warm (not hot) rocks or canteens will hasten recovery.
4. If the patient is semi-conscious or worse:
 - a. Try to keep him awake. Give warm drinks.
 - b. Leave him stripped. Put him in a sleeping bag with another person (also stripped). If you have a double bag, put the victim between two warmth donors. *Skin to skin contact* is the most effective treatment.
5. Build a fire to warm the camp.

HOW TO HANDLE EMERGENCIES IN THE FIELD

IF A SERIOUS ACCIDENT OCCURS

Survey the situation. Keep Cool. Think before acting.

Give first aid to victim but do nothing to add to his injuries.

- Treat for shock and reassure victim. Show confidence.
- Do not discuss the victim's injuries within hearing distance, even if he appears to be unconscious.

Choose messengers to go for help. Pick fast, competent individuals.

- Send at least two people if possible, three if inexperienced.
- Leave at least one person behind with the victim.

Always send a written message: name of victim, approximate age and weight, address, next of kin, date and time of injury, nature of injury, exact location (send marked map), describe terrain, type assistance needed, number of people still at accident site with victim and their condition, weather.

Messenger party should do the following.

- Take essential equipment (map, compass, flashlights, food, water, matches, protective clothing).
- Do not split up. Travel the speed of the slowest person.
- Regularly observe the country behind you toward the accident site. Mark your way with blazes, cloth strips, rock piles, bent limbs, etc., to find your way back with the rescue party.
- Conserve enough strength to lead the rescue party back if necessary.
- At the nearest phone contact the State Police district office. Be sure to give your location and the phone number.

Persons left with the victim should do the following.

- Make him comfortable. Protect him from the elements.
- Set up a temporary camp. Build a fire if possible.
- Prepare hot drinks and food for everyone.
- Whether or not the injured person is given food

Never give up. People have been known to live for well over a month with little or nothing to eat. Your brain is your best survival tool.

IF A MEMBER OF YOUR GROUP IS LOST

Stop immediately. Try to determine who saw the missing person last, when, and where. Using a map attempt to figure out where he might have gone.

Obtain as much information on the missing person as you can from the rest of the group (clothing worn, type of boots, equipment carried, habits, personality, health problems if any, outdoor experience, degree of familiarity with the country lost in, etc.)

Begin a hasty search of the area the person was last seen in. Call his name frequently. An occasional shot may help, so long as the person firing does not move about. This would confuse the lost person. Loud noises, however, tend to frighten small children and may cause them to hide from you.

If after a reasonable length of time the hasty search is not successful, send out a messenger party with the necessary information to contact the State Police.

Set up a camp in the area where the missing person was last seen and continue looking until assistance arrives. Mark any footprints or other clues that may be found.

If search dogs are available, it may be best to stay out of the search area until they are on the scene.

EMERGENCY SIGNALS

DISTRESS - Three evenly spaced signals given in no more than 30 seconds; repeat as required.

ACKNOWLEDGEMENT - Two signals given in quick succession.

RETURN TO CAMP - Four evenly spaced signals given in no more than 30 seconds; repeat as required.

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WILDERNESS TREK LEADERS' SEMINAR FIRST AID

General Introduction: All persons contemplating medical responsibility for wilderness treks, where accidents and illness must be treated without the aid of your family physician, need to familiarize themselves with proper care and possible evacuation of the ill or injured. To do this it is highly recommended that someone in the group be qualified to administer first-aid and CPR. CPR is certainly a skill that must be learned and practiced under supervision in order to be properly implemented during the time of need. There is really no excuse for everyone not becoming CPR qualified.

Definition: The immediate and temporary care of a person who has been injured or suddenly taken ill.

Legal Implications: Most states have passed Good Samaritan laws regarding first aid and cardio-pulmonary resuscitation (CPR). However, it is of primary importance that we do nothing that will compound the existing problem by rendering improper treatment.

Prevention of Medical Emergencies: Knowing what accident or illness can occur in the wilderness setting and being aware of possible occurrences prevents many of them from happening. The old adage "an ounce of prevention is worth a pound of care" is certainly true for leaders of wilderness treks.

Examination for Injuries:

1. Primary Survey
 - Airway??
 - Breathing??
 - Circulation: Pulse?? Bleeding??

2. Secondary Survey
 - Vital Signs
 - pulse rate
 - respiration rate
 - temperature
 - skin color
 - Head-to-toe examination
 - head & scalp: bleeding?? deformity??
 - pupils: equal?? unequal?? reactive??
 - eye color: glazed-not clear

-Head-to-toe examination cont.
 mouth: clear of materials??
 ears/nose: fluid or blood??
 neck: spine tenderness?? deformity??
 chest: pain?? penetration??
 abdomen: tenderness?? penetration??
 lumbar spine: tenderness??
 pelvis: compression pain??
 legs: wounds?? deformity?? tenderness?? pedal
 pulse?? foot wave?? toe touch sensation??
 arms: wounds?? deformity?? tenderness?? radial
 power?? hand wave/grasp?? finger touch
 sensation??
 back: wounds??

Do's & Don'ts:

1. Don't get in over your head. You should not attempt any treatment that you are not qualified and/or skilled at performing.
2. Be careful of making diagnoses. Stabilize the victim until qualified medical help arrives.
3. But don't be hesitant in performing the task you're qualified to perform--Be courageous.
4. The most skilled first-aider should stay with the victim while other go for help.
5. Record the basic facts pertaining to the emergency and its treatment for possible future litigation.

Treatment for:

1. Trauma
2. Choking (handout)
3. Altitude sickness (HAMS) (HAPE) (HACE)
4. Hypothermia (five lines of defense)
 First line-of-defense: Avoid exposure

Second line-of-defense: Terminate exposure

Third line-of-defense: Be able to detect hypothermia

Forth line-of-defense: Treatment

5. Gastrointestinal illnessess

-Constipation

-Dehydration

-Diarrhea

-Vomiting

6. Diabets

-Diabetic Coma

-Insulin Shock

7. Appendicitis

8. Hyperventilation

9. Cheyne-stokes respiration

10. Blisters

11. Wounds

12. Bandaging wounds

13. Burns

14. Fractures/sprains/strains/dislocation

-Symptoms of closed fracture-

-Symptoms of a sprain

-Symptoms of a dislocation

-Splints and bandages

15. Heart attack

-Symptoms

-Treatment

16. Bites & Stings (treatment)

EVACUATION PROCEDURES

Introduction: Generally speaking, you should not attempt to move a seriously injured person unless the terrain or weather condition presents a threat to the victim's safety.

A minimum of six persons is needed to evacuate a victim of average size over a rugged terrain. If the distance is not greater than 3 - 5 miles you may consider this type rescue for a person whose injuries are not too serious, the equipment is available, personnel are available and the victim's spirits are high. Consider sending for assistance or signaling for help.

Leadership: It is imperative to have good leadership qualities to carry out a successful rescue. One person should be appointed to be in charge. He/she must be able and willing to delegate responsibility in stressful situations.

Sending for Assistance: A minimum (if possible) of two persons should be sent to obtain assistance. These procedures should be followed:

- (1) Send along a written report which includes:
 - a. Location of the accident
 - b. Condition of the injured
 - c. Aid that has been provided
 - d. Pinpoint location on map or diagram
 - e. Method of signaling
 - f. Type of terrain involved
 - g. Suggested method of evacuation deemed necessary.
- (2) Do not send anyone for help if the weather constitutes a threat to their personnel safety.

Moving the Injured: If this is absolutely necessary follow these guidelines.

- (1) Do not rush (hurry makes waste)
- (2) Make systematic examination of injured
- (3) Treat where they lie
- (4) Improvise a stretcher
 - a. Coats & sticks (if smaller victim)
 - b. Lashing with ropes and sticks
 - c. Lashing and overlapping backpack frames together

- (5) Pad stretcher with sleeping bags and ensolite pads.
- (6) Strap the victim firmly to the stretcher.
- (7) Lifts/Carries - Generally speaking, more harm is done through improper movement and transportation than by any other means. If, because of extenuating circumstances, you must move a seriously injured person you should consider the following:
 - a. Anyone found unconscious, who has fallen, should be suspected of spinal injuries.
 - b. Treat all injuries before attempting a lift
 - c. Immobilize injured extremities before moving
 - d. Treat for shock
 - e. Practice lifts on a well, uninjured person prior to lifting the injured.
 - f. Test the stretcher with a larger person than the one to be transported.
 - g. Carry out the lift in a very slow and methodical manner (have a designated leader and perform by "count").

Helicopter Evacuation: This is a preferred method of evacuating a seriously injured person. Usually the safest method. They are sometimes limited due to high elevations and high winds (above 35 mph). If there is to be a helicopter evacuation follow these guidelines:

- (1) Have area clearly marked (level area if possible)
- (2) Have method to show wind direction (smoke, cloth or flag)
- (3) Have all to stay clear of landing area until pilot beckons assistance.

FIRST-AID SUPPLIES

"Master" Kit

- percogesic tablets
- asprin
- Tylenal "3" (prescribed by a physician friend)
- roller bandage 1 1/2 X 9 ft. (2)
- triangular bandages (2)
- tape, 2" X 10 yds. (1)
- moleskin 4" X 12" (1)
- bandages (assortment)
- elastic bandage 4" X 10 yds. (1)
- elastic bandage 2" X 10 yds. (1)
- gauze roll 3" X ?
- gauze pad 3" X 3" (10)
- alcohol prep pads (15)
- anti-acid tablets (15)
- Donnegel (sample size) (6)
- absorbent pads (2)
- antibiotic ointment (1)
- cleansing soap (1)
- household bleach (1 oz.) (1)

"Crew Leader" Kit

- triangular bandage (1)
- tape 2" X 10 yds. (1)
- moleskin 2" X 12" (1)
- antibiotic ointment (1)
- prep pads (10)
- elastic bandage 4" X 10 yds. (1)
- absorbent pad (1)
- roller bandage 1 1/2" X 9 ft. (1)
- household bleach (1 oz.) (1)

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